



Office of Plant Protection & Weed Management
50 Harry S Truman Parkway
Annapolis, Maryland 21401
www.mda.maryland.gov

**Maryland Department of Agriculture Plant Protection and Weed Management Section
Annual Report to the Eastern Plant Board
Mystic, CT - April 2018
Summary of 2017 Activities**

<u>Contents</u>	<u>Page #</u>
Apiary Inspection	2
Nursery Inspection and Plant Quarantine	3
Pest Survey	4
CAPS Survey	5
Farm Bill	5
Diagnostic Laboratories	7
Plant Certification	8
Weed Integrated Pest Management (IPM)	9
Noxious Weed Management	10
Other Activities	10
Plant Protection and Weed Management Summary of Activities	11

Submitted by,

A handwritten signature in blue ink that reads "Kimberly J. Rice".

Kim Rice, Program Manager

PPWM - 2017 Annual Report

APIARY INSPECTION

MDA's Apiary Inspection Program works with beekeepers, to control honey bee diseases, parasitic mites and other pests, in order to maintain healthy colonies for the pollination of Maryland crops. Honey bees pollinate crops valued at more than \$40 million. Maryland fruit and vegetable growers rent 5,000 colonies a year to improve pollination. Beekeepers' colonies are essential to Maryland because parasitic mites have nearly eliminated feral honey bee colonies.

American Foulbrood is the most serious brood disease of honey bees and can destroy a colony in one year. In 2017 six colonies were found and confirmed to have American foulbrood, as diagnosed by the USDA Bee Laboratory in Beltsville, MD; these colonies were destroyed to prevent the spread of this contagious bacterial disease into healthy colonies. The incidence of disease remains low 0.19% of the colonies inspected.

Canine Training and Certification: In 2015, the apiary program trained and certified a dog and handler to detect American foulbrood disease in honey bee colonies. Mack is a yellow Labrador retriever who has been trained to detect and alert his handler to the presence of American foulbrood disease. Now that he's on the job, Mack will work to reduce the incidence of American foulbrood in Maryland bee colonies during fall and winter when the bees are dormant. A trained dog can inspect 100 honey bee colonies in 25 minutes; an average human inspector can inspect 50 colonies in one day. Early detection of the disease will save Maryland beekeepers substantial monetary loss from eradication of diseased colonies and destruction of infected equipment. Mack inspected 2,254 colonies in 2017. A second dog was purchased in June of 2017 to be trained on the American Foulbrood scent. Clark is a 2 year old beagle-springer spaniel mix. He is currently in scent training at home and will join the Maryland Department of Corrections and Public Safety in late spring. Clark was purchased, and is maintained and trained with funds received from farm bill. He loves Mack and looks to him for guidance.

Varroa mite (*Varroa destructor*) populations were again very high in Maryland in 2017; brood problems and hive death were attributed to this pest. One of the serious problems caused by varroa mite is the transmission of viruses, which can be fatal to the hive. Ten prevalent honey bee viruses have been discovered, and the majority have an association with varroa mites. Therefore, controlling varroa populations in a hive will often control both the associated viruses and symptoms of the viral diseases.

Africanized honey bees (AHB): MDA is working with two groups – the Mid-Atlantic Apiculture Research and Extension Consortium (MAAREC), to provide information to the general public about emergency incidents, and the Apiary Inspectors of America (AIA), for information on the control of AHB movement other than through natural spread. MDA worked with the Port of Baltimore on two separate occasions this summer. With two swarm calls, located on large container ships, that came in from other ports. Both swarms were eradicated and tested and found to be European honeybees, not Africanized honeybees.

The small hive beetle (*Aethina tumida*) was detected in packaged bees and reported or detected in all 23 counties in 2017. Colonies are treated and monitored to ensure successful control of the beetles. There have been reports of larval damage to established colonies. The small hive beetle is both a major pest of stored equipment and in honey houses, rendering stored honey in the hive unmarketable.

Apiary Inspection Permits: Entry permits were issued for 3,865 honey bee colonies to move into Maryland for overwintering and beekeeper purchase. Exit permits were issued for 2,474 colonies to move out of Maryland, primarily for pollination services. For the tenth year, Maryland beekeepers have sent colonies to

California for almond pollination; 1,600 were transported to California in winter 2017 for the 2018 almond pollination season.

Surveys: Apiary Inspection assisted with one survey in 2017. Information can be found listed in the Pest Survey section of this report.

NURSERY INSPECTION and PLANT QUARANTINE

The Maryland Nursery Inspection Program serves the state's nursery and greenhouse industry which continues to be a leading component of Maryland's number one industry, agriculture. The most recent census (2012) for the green industry in Maryland currently ranks it second among commodities, with a total of approximately \$960 million in farm income. Other horticultural products and services boost total gross receipts to more than \$1.96 billion.

A primary goal of state plant protection and quarantine efforts is to facilitate the production, sale, and distribution of healthy and pest-free Maryland nursery stock. This is accomplished in large part by inspection and certification activities conducted on-site by Maryland Department of Agriculture Plant Protection & Weed Management, Nursery Inspection Program staff. Maryland law and reciprocal agreements with other states require annual production facility and sales location licensing for all producers and suppliers of nursery stock in the state. Production nurseries are inspected, at minimum annually, to ensure that plant material they produce is free of dangerously injurious plant pests. Additionally, plant dealers are inspected regularly to ensure plant materials are received from suppliers in a healthy and pest-free condition, and maintained in that condition for wholesale and retail sale.

In 2017, the Maryland Nursery Inspection Program licensed 299 nurseries, as well as 1,446 plant dealers and plant brokers. In 2017, 9,375 acres of nursery stock and 11,416,829 square feet of greenhouse production were certified. Plant Protection & Weed Management staff performed routine inspections at 760 Maryland locations.

In general, the health of Maryland-produced nursery stock was found to be excellent. Additional certification activities for 2017 involved shipment specific inspections. These included 117 state phytosanitary certificates issued to 13 states and U.S. territories. Phytosanitary inspection and certification is performed to ensure Maryland agriculture and green industry compliance with established U.S and state domestic quarantines and phytosanitary requirements for Maryland produced plant material and grain commodities. In 2017, 59 shipment specific inspections were performed, and federal phytosanitary certificates were issued to export Maryland grown and produced plant material and grain to seven foreign countries, ensuring that Maryland produced agricultural commodities meet international quarantine regulations.

A continuing effort to prevent further introduction to, and slow the possible spread of boxwood blight, *Cylindrocladium buxicola* (syn. *Calonectria pseudonaviculatum*) in the Maryland nursery and landscape industry occupied hundreds of hours of staff time throughout the year. Nursery Inspection Program staff were again involved not only in the process of inspecting for evidence of the disease at the majority of establishments visited, but were also engaged in issuing Condemnation/Seizure and Pest Control orders when infected plant material was found. Program staff were also tasked with overseeing the destruction of boxwoods infected with this highly destructive, infective, and easily spread disease.

Through nursery survey, the plant pathogen, *Phytophthora ramorum*, the causal agent of Sudden Oak death, which has many host species common in the green industry and nursery trade, was detected by survey in 2016. A follow-up survey was conducted by MDA and USDA APHIS PPQ staff, the agencies worked together to develop a compliance agreement for the affected commercial establishment. Several nursery inspections

and surveys were also conducted throughout the year at this nursery to ensure eradication of this very destructive disease.

MDA PP&WM staff continued its role evaluating federal (USDA) permits to move plant germplasm and plant and insect pests into the state for purposes of scientific study, breeding (plant germplasm) controlled release (insect and weed biological control organisms) and evaluation. MDA regularly reviews permit applications to ensure that importers meet security and containment requirements for importation of otherwise prohibited or restricted taxa. In addition to initial permit review, there are site visits and follow-up inspections also performed by MDA PP&WM staff.

In a related concern, MDA PP&WM is one of a small group of stakeholders nationwide that has been recruited to participate as part of a working group to evaluate the restructuring of the US Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (USDA APHIS PPQ) Post Entry Quarantine program (PEQ). APHIS PPQ is considering significant restructuring of the PEQ program after review of this program by the Agricultural Quarantine Inspection Board. This working group currently participates in telephone conferences with representatives from the USDA, and other states, and is working toward modifying and streamlining import processes that will increase efficiency, while at the same time reduce risk. As in the past, until policies and protocols are changed, PP&WM staff will continue to conduct post entry quarantine and facility inspections per status quo within the State of Maryland.

In another matter, distribution of information to the green industry and enforcement of new invasive plant regulations that took effect in 2016 has proven to be an additional challenge for program staff due to significant investment of hours and effort dedicated to education and outreach about, inspection for, and enforcement of these regulations.

Staff continues to be vigilant, and participate in inspections and surveys aimed at early detection and slowing the spread of serious pests and diseases that are not known to occur in Maryland. Threats such as the insect pests: Asian longhorned beetle (*Anoplophora glabripennis*) and spotted lanternfly (*Lycorma delicatula*) and the plant diseases: sudden oak death (*Phytophthora ramorum*) and thousand cankers disease of walnut (*Geosmithia morbida*) are considered high risk in this regard. Additionally, field and clerical staff work year-round to ensure that licensing and compliance regulatory statutes are met by the industry.

In 2017, all program staff members participated in and continued to attend training workshops, conferences, professional meetings, and field exercises; both in-state and regionally, to remain informed of newly developing issues and to gain expertise in order to better serve the program, the Department, industry stakeholders and the citizens of Maryland.

PEST SURVEY

The Cooperative Agricultural Pest Survey (CAPS) and Farm Bill surveys are joint projects between MDA and USDA's Animal and Plant Health Inspection Service (APHIS) and USDA Plant Protection and Quarantine (PPQ). The USDA recommends specific pests of quarantine export significance as survey priorities and provides funding for these surveys. These cooperative survey programs provide necessary data used to certify Maryland products for export to many countries. They also allow for continued outreach and education.

CAPS and Farm Bill surveys document the presence or absence of exotic pests in Maryland, support PPQ exotic pest survey activities and provide state-specific data for exotic pests in the United States. Early detection of exotic pests before they become established aids in eradication or control efforts, and protects Maryland agriculture, nursery stock, and the environment from potential devastating losses. Federally funded CAPS surveys include: exotic wood borers, soybean commodity, and imported fire ant (*Solenopsis*

invicta); the Farm Bill surveys include: *Phytophthora ramorum* (nursery), exotic pests of honey bees, small fruit commodity, and grape commodity.

In 2017, MDA deployed and monitored 377 insect traps and collected 5,594 samples from these various traps. There were seven extensive surveys targeting 36 exotic pests that impact nursery stock, apiaries, fields, vineyards, orchards, and nursery stock.

CAPS SURVEYS

Soybean Commodity – Soybean is the second most valuable crop grown in Maryland, after corn. For this reason, ensuring that our state is free of known exotic pests of this commodity is of great importance. This survey was conducted from June through mid-October in four counties known to have high production rates of soybean, based on harvested acreage in previous years. None of the targeted pests were found to be present in any of the 64 traps throughout the sampling period. Additionally, a visual survey was conducted for the bean plataspid (*Megacopta cribraria*), a true bug of particular concern within Maryland, and a known pest of soybean. A visual survey was conducted at each site once every two weeks, and resulted in no findings of this pest.

Exotic Wood Boring Beetles - USDA regulations require all imported wood packing material to be treated, so that any insect living in the wood should be killed. However, some packing material is not properly treated, which can cause exotic wood borers to be shipped to the US, and thus be introduced into our environment. Bark beetles can be extremely destructive and, in parts of the world, have been known to destroy large acreages of forest. In 2017, ten sites that receive goods packed with wood dunnage were surveyed for exotic wood boring bark beetles. During the trap checks, which occurred once every two weeks, a visual survey for spotted lanternfly (*Lycorma delicatula*), a newly introduced invasive insect from Asia, was also completed. This survey ran from late March until late October. All samples were negative for the species being targeted. Additionally, one of the sites surveyed for EWBB pests also housed a blacklight trap. This trap is used for long-horned beetle detection, but did not detect any of the high priority pests for which we were surveying.

Red Imported Fire Ant - The red imported fire ant (IFA), *Solenopsis invicta*, a stinging insect native to South America, is occasionally shipped out of its regulated area in the southern United States. Despite its quarantine, which requires a wide variety of commodities to be treated or certified free of fire ants before being transported, some infested nursery stock does make its way into Maryland. The yearly fire ant survey focuses on tropical plants arriving from the southern United States. In 2017, 137 sites were surveyed and five were found positive for IFA. Sites were issued eradication treatment orders under an MDA Treatment Order; they have completed the treatments, have been resurveyed, and were found free of IFA.

FARM BILL SURVEYS

Exotic Pests of Honey Bees – Honey bees are important for many reasons, but perhaps the most important is that they are the sole or main pollinator of various crops, which makes them a vital part of Maryland's agriculture. As honey bee populations decline from a variety of issues, it is vital to identify and screen for any possible exotic pests which could exacerbate the situation. Honey bees have many exotic and invasive pests. A partial list includes members of the same genus, but different species or subspecies, such as the Asian or Eastern honey bee and its subspecies or strains (*Apis cerana*), the Africanized honey bees (*Apis mellifera scutellata*), and the Cape honey bees (*Apis mellifera capensis*). Asian giant hornet (*Vespa mandarinia*) and its subspecies, the Japanese giant hornet (*V. m. japonica*), the Asian hornet (*V. velutina*), and other *Vespa* species are also included in this list of exotic pests. Rounding out the list are *Tropilaelaps* species, parasitic mites which feed on the hemolymph (blood) of developing honey bees. Although these pests have not been found in Maryland, it is important to have a plan in place to survey for them, and react swiftly and appropriately should they appear, to prevent them from becoming established. Eight sites were

selected throughout Maryland. Particular emphasis was put on sites near transportation routes or other high-risk pathways, which are known as possible areas of introduction for foreign species. From late May until mid-October, Lindgren funnel traps were placed at each site and examined once every two weeks for the presence of any of these pests, particularly *Vespa* species. No target species were found throughout the survey which was conducted by the Apiary Inspection staff.

Small Fruit Commodity Survey – The small fruit (blackberries, blueberries, cherries, raspberries & strawberries) crop in Maryland is growing, especially with growers that participate in u-pick programs. In the latest census from 2012, Maryland had 491 growers growing approximately 462 acres of small berries. The 2017 survey was conducted from June through October, in eight orchards across six Maryland counties, with emphasis on orchards that had as many different types of small fruit as possible. The targets were two invasive moth pests and three invasive fruit fly species. At each orchard, two standard bucket traps, one delta sticky trap, one Jackson body trap, and one baited yellow sticky trap card were placed and baited with lures attractive to the specific pests. The traps were serviced once every two weeks during the survey period. One of the fruit flies being surveyed for, the spotted wing drosophila (*Drosophila suzukii*), was found to be present at each of the orchard sites being surveyed. This nuisance pest has been reported anecdotally throughout Maryland, but until this survey, has not been officially confirmed.

Grape Commodity Survey – Vineyards and wineries are an expanding industry in the state of Maryland. However, as vineyard acreage increases, the opportunities for invasive pests to be introduced and become established also increase. This survey was conducted from the middle of June until late October, in 10 vineyards, covering five Maryland counties, in order to confirm the absence of invasive moth pests. At each vineyard, two standard bucket traps, one delta sticky trap, and one Jackson body trap were placed. Each trap was baited with a lure attractive to a different moth of concern. These traps were checked once every two weeks throughout the sampling period, and no target species were discovered. During the bi-weekly trap checks, a visual survey for spotted lanternfly (*Lycorma delicatula*), a newly introduced invasive insect from Asia, was also done, although none were found to be present. An additional part of this survey involved a visual survey of grape vines, looking for a grape phytoplasma and a fungal disease, brown rot. PPWM's Plant Disease Specialist ran both disease surveys. There were 301 leaf samples taken, all samples were negative for both the grape phytoplasma and brown rot.

Phytophthora ramorum Nursery Survey – The *P. ramorum* survey covered nurseries, garden centers, and landscape sites. Staff visited 7 nurseries and garden centers receiving plant material from Oregon, California, and Canada, and inspected 3,814 azalea, camellia, kalmia, pieris, rhododendron, and viburnum plants. Less than 8% of plants examined exhibited symptoms similar to those caused by *P. ramorum*. Two hundred seventy-seven symptomatic samples of different plant species were collected and tested for *Phytophthora* spp. by ELISA kit, and 10% of samples were found positive. All *Phytophthora* spp. positive samples were submitted to the Cornell University Diagnostic Clinic for *P. ramorum* confirmation. All of these *Phytophthora* spp. positive samples were determined to be negative for *P. ramorum*. Additionally, a survey was done at the 2016 positive site, in order to confirm that *Phytophthora ramorum* was no longer present. Plants were inspected both in the spring and again in the fall. In the spring survey, 63 symptomatic plants were collected and tested for *Phytophthora* spp. by ELISA kit, and 15 of these were positive. In the fall survey, 39 symptomatic plants were collected and tested, and 10 of these tested positive for *Phytophthora* spp. All *Phytophthora* spp. positive samples were submitted to the Cornell University Diagnostic Clinic for *P. ramorum* confirmation. All of these *Phytophthora* spp. positive samples were determined to be negative for *P. ramorum*. The PP&WM Plant Disease Specialist supervised and conducted this survey.

DIAGNOSTIC LABORATORIES

The Plant Protection and Weed Management Section laboratories provide testing, analyses and identifications to support MDA programs, as well as providing answers to inquiries from outside the department.

Entomology Laboratory: In 2017, the Entomology Laboratory received a fair number of bed and bat bugs (Hemiptera: Cimicidae), as well as several common pantry pests, for identification. Unusual submissions included winged adults of the dark Southeastern subterranean termite, *Reticulitermes virginicus* (Isoptera: Rhinotermitidae) a fall-emerging native species that appeared in September, in Annapolis. Adults and egg cases of brown widow spiders, *Latrodectes geometricus* (Araneae: Theridiidae) were collected in Beltsville. This species appears to be expanding its range north and west by human activity. Balsam woolly adelgid, *Adelges piceae* (Hemiptera: Adelgidae) was detected in Garrett County.

A rather uncommon large southern visitor, the black witch moth, *Ascalapha odorata* (Lepidoptera: Erebidae/Noctuidae) was collected in Glenelg, and several Florida predatory stink bugs, *Euthyrhynchus floridana* (Hemiptera: Pentatomidae) were observed in survey traps and home landscapes.

The anticipated four-year acceleration of 'early' Brood X cicadas, *Magicicada* sp. (Hemiptera: Cicadidae) offered a small taste of the Big Brood's emergence, coming to much of Maryland in 2021.

Plant Pathology Laboratory: The plant pathology laboratory provides testing, analysis, and recommendation services for problems caused by abiotic (water, soil, chemical, and management) and biotic pathogens (fungi, bacteria, viruses, and nematodes), to support the department's programs. The pathology laboratory received 91 plant samples for diagnosis and management solutions during the 2017 growing season. A majority of the samples came from nursery inspectors, some from pesticide inspectors, landscapers, and home owners. This year, several samples tested were due to pesticide damage, especially early in the season after heavy rain. In addition, 12% of samples received were abiotic-related, such as watering issues, soil management, pesticide damage, cold damage, etc., while other samples were caused by biotic pathogens, such as fungi, bacteria, viruses and nematodes. The majority of samples received were caused by fungal pathogens. Management strategies based on an integrated pest management approach were recommended for these problems, other than exotic diseases such as boxwood blight, *Phytophthora ramorum*.

The exotic disease, boxwood blight, *Cylindrocladium buxicola* (syn. *Calonectria pseudonaviculatum*) remained a high priority problem. Ten nurseries are under compliance agreement for clean and disease-free boxwood production. Several samples were received to check for the infection of *C. buxicola* fungi, samples from three nurseries were found positive for the pathogen. Necessary action was recommended to eradicate the source. In 2017, the plant pathology lab also participated in the *Phytophthora ramorum* Nursery survey and the Grape Commodity survey. Detailed information can be found in the Pest Survey section of this annual report.

Greenhouse Laboratory: Mile-a-minute (MAM) weed plants (*Persicaria perfoliata*) were produced for the integrated pest management and biological control program for insect colonies that require food and plant material. Over 1,650 MAM stem cuttings were taken and 1,586 MAM plants were transplanted and grown in the greenhouse to be used as food for colonies of the stem-boring weevil, *Rhinoncomimus latipes*.

Virus testing continued on eight varieties of strawberry plants in support of a Memorandum of Understanding with a strawberry breeding company. Testing continues on one additional variety of strawberry brought into the greenhouse in 2015. The poor condition of the original plants from this breeding company required testing of the variety to continue into the 2017 season. Indicator and positive control strawberry plants were maintained throughout the year to support this testing.

Virus indicator plants, those that show symptoms in the presence of certain viruses, of fifteen different genera and species, are seeded and transplanted weekly to be used, when needed, to test plants submitted

by the nursery inspection staff for possible presence of virus diseases. Additional support for the Nursery Inspection Program is provided when plant specimens, believed to be infected with disease are brought in by nursery inspectors and held at the greenhouse for observation and further tests.

A variety of other programs take place at the greenhouse on a yearly basis. These include plants produced to support MDA displays at the Maryland Home and Garden Show, as well as the Maryland State Fair. Plants are also grown and maintained for use during the Certified Professional Horticulturist (CPH) exams given at MDA headquarters twice a year and proctored by PP&WM staff, in cooperation with the Maryland Nursery, Landscape, and Greenhouse Association.

PLANT CERTIFICATION

The **Maryland Ginseng Management Program** protects American ginseng, *Panax quinquefolius*, by monitoring the harvest, and by licensing diggers and dealers of wild, wild-simulated, woods-grown and cultivated ginseng. MDA conducts a management program in cooperation with the U.S. Fish and Wildlife Service (FWS). The program follows established protocols and Convention on the International Trade in Endangered Species (CITES) regulations to ensure continued viability of this potentially threatened native resource and to protect it from over-harvest. Through this program and the inspection and certification process, licensed dealers are enabled to legally sell the wild-harvested plant interstate and in international markets. MDA also works with growers of wild-simulated and woods-grown ginseng to allow them to meet regulatory requirements, and to market and export their highly valued crops. These roots, both dried and fresh (green), are highly prized, especially in China and Korea, for properties that putatively promote good health. High quality native ginseng root continues to be in great demand on the international market, and prices for wild American ginseng generally increase over time. In 2017, however, prices remained low for the second straight year, rarely exceeding \$500 per pound for dry ginseng. Possible factors contributing to this decrease are mentioned below. During the 2016-2017 season, the program licensed 18 ginseng dealers and 209 ginseng collectors in the state. For the 2017-2018 season, those numbers are 11 and 175, respectively. Any number of factors may be responsible for the declines of dealers and growers. Licensing for ginseng dealers and collectors starts after July 1 of each year as the collection season for wild harvested ginseng does not begin until September 1. The harvest season ends December 15 and the sales season ends March 31 of the following year. The harvest numbers reported are for the program season beginning September 1, 2016 and ending March 31, 2017.

Over the 2016-2017 harvest and sales season, the certification program inspected, collected size and age data from and weighed and certified 108.78 pounds of dry wild ginseng root, 7.34 pounds of green (fresh) wild ginseng root, 30 pounds of wild simulated dry ginseng root, and 122.8 pounds of wild simulated green ginseng root. No woods- grown or cultivated ginseng root was certified for the 2016-2017 harvest season. For the purpose of this report, both artificially propagated (cultivated and woods grown) and wild simulated ginseng harvests are being recorded as artificially propagated. Both artificially propagated and wild simulated ginseng (distinctions recognized by the U.S. Fish and Wildlife Service and CITES) are being grown as alternative agricultural crops in Maryland.

As compared to numbers recorded for 2015-2016, the 2016-2017 harvest and certification numbers are about 51% lower for dry wild ginseng and 17% greater for artificially propagated dry ginseng. The amount of wild green ginseng root certified in the 2016-2017 season represents about a 35% increase as compared to 2015-2016. For wild simulated green root there was a dramatic increase of 96% compared to 2015-2016. As reported since 2014, changes in certification of green (fresh) ginseng likely parallel market demand for, and the domestic use of fresh ginseng in the U.S. domestic market and the rise of a relatively novel type of ginseng

buyer.

Fluctuations in the amount of Maryland ginseng certified and sold likely reflect the demand and pricing on the international market, (and more recently a specialty sector in the domestic market) and do not necessarily directly reflect the status or abundance of wild American ginseng in Maryland. Many ginseng collectors and growers refuse to sell ginseng in a depressed market, preferring to wait until the price increases with a market rebound. As is done each year, harvest and sales data were gathered and reported in accordance with U.S. Fish and Wildlife Service (USF&WS) and CITES requirements. The USF&WS, Office of Management Authority continues to find Maryland's wild ginseng harvest as sustainable and "non-detrimental" to wild American ginseng populations in Maryland.

The amount of ginseng cultivated and certified by the department, including woods-grown and wild-simulated designations in Maryland, continues to keep pace with the amount of wild ginseng harvested and certified in the state. This reflects both continuing interest in ginseng as an alternative crop, and the ability of Maryland growers to produce high quality ginseng.

Responses to annual questionnaires mailed to ginseng collectors and dealers at time of licensing were modified in 2015 and 2016, and again in 2017, to gather currently pertinent information on program participants concerns and opinions. Many respondents continue to relate that the incidence of out-of season poaching of wild ginseng in Maryland remains high. There was also concern regarding the lack of on-the-ground enforcement relative to illegal ginseng harvest. Also expressed was the sentiment that preventing legally licensed collectors from harvesting on state managed land actually promotes poaching, as there are fewer legal harvesters active to report illegal activity. Most participants in the Maryland Ginseng Management Program view themselves as stewards and protectors of a natural heritage.

In 2016-2017, MDA continued to evaluate harvest trends and watch for positive developments resulting from a regulation change made July 1, 2010. As of that date, the harvest season for wild American ginseng in Maryland was changed from 20 August-15 December to 1 September-15 December. This change effectively gives the ginseng fruit longer to ripen (on average) and insures a higher percentage viability of seed. This allows wild ginseng populations a better opportunity for recovery from harvest pressures. It remains to be documented that these changes have affected any population increase in the field. It is expected that any change will be gradual. This revision in harvest dates also complies with harvest season modifications highly recommended by the U.S. Fish and Wildlife Service. This change not only brings all states with wild American ginseng populations into harmony in terms of parallel harvest season dates, but is also based on long term research indicating that the revision is necessary to ensure a longer season for seed development and ripening that will enhance long term survival of wild American ginseng in its native range.

In July of 2017, MDA Ginseng Management Program staff had the opportunity to attend the American Ginseng Coordination Meeting between USF&W and State and Tribal Ginseng Management Programs as well as subsequent meetings and symposiums with educators, growers, dealers, and the herbal industry in Morgantown, WV, July 11-14, 2017. This was the first such opportunity in nearly 8 years and provided the 19 states and one tribe represented, to openly collaborate with USF&W representatives to discuss the many pertinent issues currently being faced by each stakeholder. These shared issues include the potential black market sale of ginseng, and methods used by law enforcement to combat such sales, ginseng market trends, data collection and certification methods, and State/Tribe licensing fees issued for collectors and dealers.

WEED INTEGRATED PEST MANAGEMENT (IPM)

Maryland Department of Agriculture (MDA) Plant Protection and Weed Management Section entomologists

and staff continued to work with the Maryland Department of Transportation, State Highway Administration (SHA) to conduct an integrated pest management (IPM) program aimed at providing biological control for certain targeted weed species on SHA right of ways. In 2017, weed IPM research and demonstration activities were conducted on SHA right of ways, using funding from SHA and the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (USDA /APHIS/PPQ). MDA weed management and biological control research and demonstration projects have been conducted over each of the past 19 years under current program management, and have involved cooperation with the Maryland State Highway Administration, the Howard County Department of Recreation and Parks, the Maryland National Capitol Park and Planning Commission, the Maryland Department of Natural Resources, the U.S. Department of Agriculture (both the Agricultural Research Service (ARS) and APHIS), the U.S. Forest Service, The U.S Fish and Wildlife Service, the U.S. Geological Survey and, in certain cases, private Maryland businesses and landowners.

Currently MDA is focused on biological control of mile-a-minute weed, *Persicaria perfoliata*, and purple loosestrife, *Lythrum salicaria*, using very specific insect biological control agents. Beginning in July 2017, MDA PP&WM entered into a new two-year agreement with the Landscape Operations Division of the Maryland State Highway Administration to administer a program to continue biological control driven suppression of mile-a-minute weed, and to reinstate a program aimed at suppression of purple loosestrife on state highway right of ways. These programs include lab, greenhouse rearing, and field release and monitoring of the weevil, *Rhinoncomimus latipes*, and field release and monitoring of *Galerucella (Neogalerucella)* leaf beetles. Funding for rearing, release and monitoring of the weevil and purchase, release and monitoring of the leaf beetle is provided in part by SHA. An additional source of funds for this project comes from a cooperative agreement with USDA APHIS PPQ that has been renewed on an annual basis.

The insect rearing lab staff, reared 11,489 weevils in 2017. In 2017, 10,007 adult weevils were released at a total of 20 sites statewide, 10 of which were new locations. MDA reared 7,007 of the adult weevils released. Release numbers were supplemented by an additional 3,000 weevils acquired from the New Jersey Department of Agriculture, Phillip Alampi Beneficial Insects Laboratory. The rearing program also involves greenhouse growing of the host plant, *Persicaria perfoliata* (mile-a-minute weed). The host plants are grown in the MDA greenhouse in Annapolis, MD. In 2017, nearly 2,000 *Persicaria perfoliata* plants were grown.

Rhinoncomimus latipes has now been released by MDA staff and is established in at least portions of the following Maryland counties: Allegany, Anne Arundel, Baltimore, Carroll, Cecil, Charles, Frederick, Garrett, Harford, Howard, Kent, Montgomery, Prince George's, Queen Anne's, Somerset, Washington, and Wicomico. The biocontrol program benefited from an increased SHA budget and acquired a new growth chamber for continued production and storage of *Rhinoncomimus latipes*. This new piece of equipment can mitigate production issues by allowing climate controlled storage of weevils.

NOXIOUS WEED MANAGEMENT

The purpose of this program is the control and eradication of designated noxious weeds in order to reduce their economic and aesthetic impact on farmers and landowners. Noxious weeds (Johnsongrass, shattercane, thistles) cause losses in excess of \$25 million annually to Maryland agriculture due to reduced yields and quality of crops and forages, and increased control costs. Increased expenses are also incurred for roadside and non-crop property management.

The Noxious Weed Law has a provision that the Maryland Department of Agriculture may enter into cooperative agreements with county or political subdivisions to provide management, technical assistance,

training, and education for implementing noxious weed control programs. The county weed control programs are supervised by state personnel as specified by these cooperative agreements.

In the 15 participating counties, a weed control advisory committee with representatives from farming organizations, governmental agencies, local farmers, and property owners, provides guidance for the program in that county. A county weed control coordinator is employed to determine infestations within the county, inspect uncontrolled infestations, provide information on appropriate control practices, and initiate control agreements with landowners to implement control.

In 2017, noxious weed advisory notices were sent to 337 managers of property infested with noxious weeds. Generally, these notices were effective in obtaining compliance. When notifications are unsuccessful, the Department may take legal action.

The weed control program also responds to citizens' requests for technical assistance in controlling invasive, difficult to control, persistent weeds such as *Phragmites*, multiflora rose, kudzu and Callery pear trees. In addition, the weed control program also monitors giant hogweed, a federal noxious weed, that was first detected in Maryland in 2003. It exists on sites in Baltimore, Harford and Garrett counties. In 2017, six sites were treated, two in Baltimore County, two in Garrett County and two in Harford County. County weed control programs provided spray crews and materials to treat these giant hogweed infestations. Eradication is a multi-year effort and the weed control program will treat infestations at the landowners' expense.

The weed control staff partnered with the Maryland Department of Natural Resources (DNR) for the sixteenth year in providing a *Phragmites* management program. Upon request from landowners or managers, program staff supplies technical and spraying assistance for control. The DNR provided 100 percent of the herbicides applied in the nine Eastern Shore counties for spraying *Phragmites*.

OTHER ACTIVITIES

During 2017, Plant Protection & Weed Management staff continued to administer basic and specialist examinations for the Maryland Certified Professional Horticultural program. The program was developed by the Maryland Nursery, Landscape, and Greenhouse Association (MNLGA) to raise and improve the professional standards of Maryland's nursery, landscape, and garden center industry by giving special recognition to individuals who have shown a high level of aptitude, and allow them to be recognized by the gardening public. The program has also expanded to high school programs that specialize in a horticultural curriculum, approximately 70 Maryland high school students participated in the exam in 2017.

The Plant Protection and Weed Management program is involved in the Invasive Plant Advisory Committee. This committee is mandated by law to develop a list of invasive plants, using a tiered system. The law focuses on the nursery industry. Presently there are six Tier 1 plants which cannot be sold in MD, and eleven Tier 2 plants that may be sold but are required to have an invasive plant warning sign.

The PPWM staff developed regulations on the most recent update to the industrial hemp law. These regulations were later withdrawn as the program waits for a more comprehensive industrial hemp law.

Plant Protection and Weed Management Summary of Activities

	CY2015	CY2016	CY2017
Beekeepers Registered	1,895	2,017	2,180
Honey bee Colonies Registered	14,594	15,550	15,630
Honey bee Colonies Inspected	2,224	2,095	3,011
Ginseng Dealers Registered	19	18	11
Ginseng Collectors Licensed	247	209	175
Nurseries Certified	315	311	299
Plant Dealers and Brokers Licensed	1315	1434	1446
Phytosanitary Certificates Issued	247	326	176
Plant Pest Surveys # target pests	52	52	36
Plant Pest Surveys # samples processed	2,906	3,107	5,594
Target Pests Detected	9	6	13
Number of noxious weed advisory notices issued	361	318	337